

## Single-family Affordable Solar Homes (SASH) Program

### Q4 2011 Program Status Report



January 2012



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## 1. Program Summary

The Single-family Affordable Solar Homes (SASH) Program is one of the California Solar Initiative's (CSI) two low-income programs. GRID Alternatives, a non-profit solar contractor, is the statewide Program Manager for the SASH Program. The SASH incentive is available to qualifying low-income homeowners in the Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E) service territories.

The SASH Program is uniquely designed to be a comprehensive low-income solar program. In addition to providing differential incentives, SASH is structured to promote or provide energy efficiency, workforce development and green jobs training opportunities, and broad community engagement with low-income communities. There is no other low-income solar program in California that has such a diverse range of benefits for low-income communities. It is truly a first-of-its-kind solar program.

The SASH incentive provides low-income families with free or low-cost solar photovoltaic (PV) systems that significantly reduce household energy expenses and allow families to direct those savings toward other basic needs. GRID Alternatives' volunteer-based installation model has proven to be a highly efficient and low-cost model that makes solar even more affordable for low-income homeowners. In addition to being the primary installer for SASH, GRID provides education on and access to energy efficiency programs that further reduce a household's energy consumption and expenses.

In implementing the SASH Program, GRID Alternatives provides opportunities for local volunteers to assist with installations, to engage their communities, and to participate in CSI programs. Currently, GRID has thousands of volunteers statewide to help promote and install solar in low-income communities. GRID requires its volunteers to participate in a solar orientation program that educates these potential solar adopters about solar PV and energy efficiency. This basic consumer education program will help further the broader CSI goals of promoting the use of solar PV technology statewide and helping build broad-based community support for solar electric technologies and energy efficiency.

Finally, SASH provides a foundation for promoting and building a sustainable solar industry in California by incorporating a workforce development and job training component into the program. GRID partners with local job training programs to give their trainees an opportunity to get hands-on installation experience. The SASH Program also promotes partnerships between solar contractors and local workforce development programs by including a job training requirement for all sub-contracted SASH projects. This becomes a double benefit to low-income communities since many green-collar job trainees come from the same communities that the SASH Program aims to serve.

## 2. Background

In D.06-01-024, the California Public Utilities Commission ("the Commission") adopted the Staff proposal to set aside a minimum of 10% of CSI Program funds for projects installed for low-income residential customers and affordable housing projects. In 2006, the California Legislature codified this requirement in Senate Bill (SB) 1 and Assembly Bill (AB) 2723. Subsequently, in D.06-12-033, the Commission directed the Program Administrators (PAs) to conform the CSI Program to SB 1<sup>1</sup> and AB

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<sup>1</sup> SB 1 (Murray & Levine), *Chapter 132, Statutes of 2006*, sets forth specific CSI program requirements regarding program budget, conditions for solar incentives, and eligibility criteria

2723<sup>2</sup> requirements and directed that 10% of the total ten-year CSI budget would be reserved for the low-income residential solar incentive programs that are now referred to as the Single-family Affordable Solar Homes (SASH) and Multifamily Affordable Solar Housing (MASH) Programs. GRID Alternatives was selected as the statewide Program Manager for the SASH Program.

In D.07-11-045, the Commission established the \$108.34 million SASH Program as a component of the CSI Program. The SASH Program provides incentives “for homeowners who occupy their homes and meet the definition of low-income residential housing established in Public Utilities Code Section 2852.”<sup>3</sup> The Commission adopted an incentive structure that provides a fully-subsidized 1kW PV-solar system to “very-low income” households, and a partial-subsidy to qualified “low-income” households.

The overall goal of the SASH program is “to provide existing low-income single family homes with access to photovoltaic (PV) systems to decrease electricity usage and bills without increasing monthly household expenses.”<sup>4</sup>

The SASH Program will operate either until December 31, 2015, or when all funds available from the program’s incentive budget have been allocated, whichever event occurs first. Public Utilities Code Section 2852(c)(3) requires that any program dollars remaining unspent or unencumbered on January 1, 2016, are to be used for Low Income Energy Efficiency programs.

Details of the SASH Program can be found in the CSI Program Handbook or at [www.gridalternatives.org/sash](http://www.gridalternatives.org/sash).

### 3. Q4 2011 Overview

Q4 2011 ends a year of tremendous growth and expansion for GRID Alternatives and the SASH Program throughout California. Over 880 kW of solar electricity were interconnected through SASH in Q4 2011 alone, which is particularly remarkable when taking into account that nearly 70% of the installed PV-systems are between 1-3 kW. SASH also surpassed a significant Program Milestone during Q4 2011 by completing the 1,000<sup>th</sup> installation. With this achievement, SASH has met or exceeded each of the three Program Milestones delineated in the SASH RFP and Decision 07-11-045.<sup>4</sup>

The Program Milestones are designed to be benchmarks indicative of the Program Manager’s success at implementing the SASH Program. Due to the initial delays in Program contracting, fulfillment of the Milestones by the end of 2011 is congruent with the Commission’s intended timeframe for completion<sup>5</sup>. To begin, GRID’s seven offices in Oakland, Carson, San Diego, Fresno, Atascadero, Riverside, and Chico effectively allow the SASH Program to reach and serve all eligible clients in the 3 IOU territories, thereby meeting the first Program Milestone. In addition, the SASH Program completed and interconnected 1082 projects through Q4 2011, thereby exceeding the second short-term Program Milestone of 1,000 PV systems installed. The third Program Milestone, to identify and contact all eligible clients in the 3 IOU territories, was completed in 2010 though as eligibility criteria is regularly updated by the CPUC, GRID continues to identify newly qualified homeowners.

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<sup>2</sup> AB 2723 (Pavley), Chapter 864, Statutes 2006, required the Commission to ensure that not less than 10% of the CSI funds are used for the installation of solar energy systems on low-income residential housing and authorized the Commission to incorporate a revolving loan or loan guarantee program for this purpose.

<sup>3</sup> D.07-11-045, Appendix A, p.1

<sup>4</sup> D.07-11-045, Appendix A, p.1

<sup>5</sup> Administrative Law Judge Ruling, 1/12/09.

GRID completed the SASH Pilot Monitoring Project in Q4 2011, in collaboration with ITRON, Inc. and has installed 10 PV-solar monitoring systems at SASH projects in the Bay Area. Because this particular ITRON technology employs a cellular signal rather than an internet connection, GRID anticipates it could be more easily implemented on a broader scale for SASH clients in the future than typical internet-based systems, an important consideration given that the majority of SASH clients do not have reliable internet at their home.

At the end of Q4 2011, 1093 PV-systems have been installed and interconnected, 225 projects have been reserved and are awaiting installation or interconnection, and another 483 applications statewide are under review by GRID's construction staff and sub-contracting partners to determine if a system design meets the SASH Modified Design Factor (MDF) requirement.

To attract new SASH clients, GRID continued to focus on the following core endeavors: expanding marketing and outreach scope; fostering new relationships and strengthening existing partnerships with volunteers, job training programs, and municipalities; and increasing communication and media capacities. Word-of-mouth and testimonials from satisfied customers continue to be the best marketing tool for acquiring new SASH clients and fortifying existing clients' relationships.



The SASH Program continues to provide green job training opportunities at every installation. As GRID expands its regional offices, new partnerships are developing at a local level between GRID staff and the leaders of job training organizations and community college programs that would like to have their graduates obtain on-the-job training at a SASH installation. Every GRID installation is staffed by either a team of volunteers from the local community or graduates from job training programs. In addition, each sub-contracted installation requires at least one job trainee to be on site, as a paid worker learning valuable skills.

These green job training opportunities form the backbone of SASH and create lasting value in local communities by helping foster a new green workforce – a workforce of skilled laborers, many hailing from the same communities that SASH aims to serve – that will have high employability in the increasing solar job sector in California and the nation.

## 4. Budget

The SASH Program budget is \$108.34 million. The program will be funded by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) according to the following percentages:

**Table 1: SASH Budget Allocations by Utility Territory**

	PG&E	SCE	SDG&E	Total
<b>Budget %</b>	43.7%	46%	10.3%	100%
<b>Total Budget (\$ in millions)</b>	47.34	49.8	11.2	108.34

The Program Manager shall ensure that the \$108.34 million is allocated as follows across program functions:



**Table 2: SASH Budget Allocations by Program Functions**

	Budget, %	Budget, \$	Expensed / Encumbered thru Q4 2011
<b>Incentives</b>	85%	\$92,089,000	\$34,150,000
<b>Administration</b>	10%	\$10,830,000	\$3,365,497
<b>Marketing and Outreach</b>	4%	\$4,330,000	\$1,345,362
<b>Evaluation</b>	1%	\$1,091,000	Budget resides w/ CPUC
<b>Total</b>	100%	\$108,340,000	\$38,860,859

## 5. Program Growth and Project Costs

The SASH Implementation Plan delineates cumulative targets for installations and incentives for each year of the SASH Program, thereby allowing GRID to benchmark the Program's progress and ensure that each IOU's allotted incentive dollars are being applied appropriately. In the SASH Implementation Plan, GRID originally anticipated that by the end of 2011, the SASH Program would have a total of 800-900 applications totaling around \$20M in incentives and ~3.5MW (CEC-AC). **At the end of 2011, SASH has surpassed its 2011 targets by ~60%, with >1,800 applications totaling 5.3MW and nearly \$35M in incentives.** This propels SASH into 2012 on track to meet or exceed its cumulative target of \$40M in incentives and ~6MW (CEC-AC) for next year as well.

Table 3 summarizes the status of all SASH applications through Q4 2011.

**Table 3: SASH Applications by Status and Service Territory**

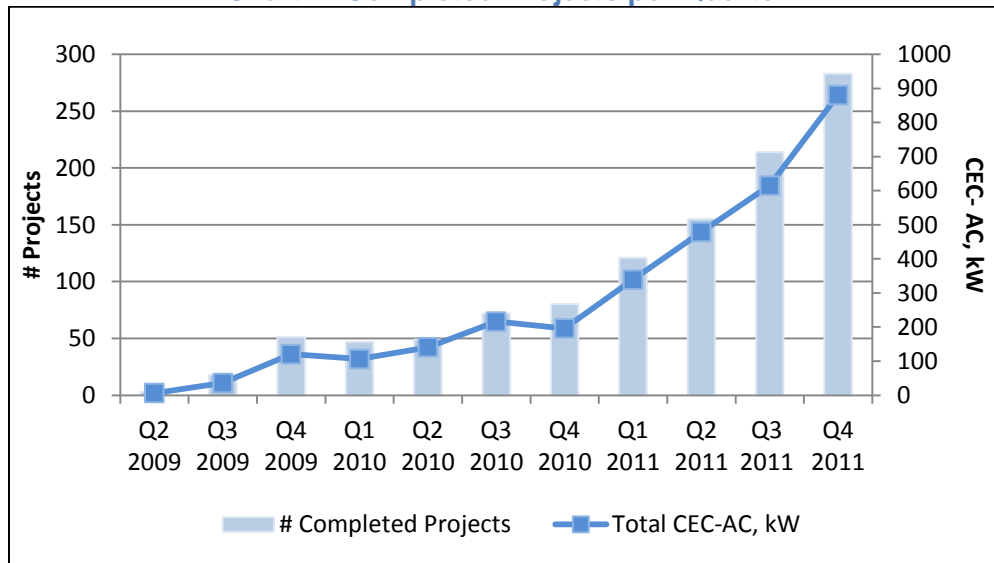
Application Status	Number of Applications				Total kW, (CEC-AC)	Total Incentives, \$ millions
	PG&E	SCE	SDG&E	Totals		
STEP 1: Applications under review	254	182	47	483	1,207.5*	\$7.26*
STEP 2: Confirmed Applications/Reservations	109	105	11	225	749.5	\$4.71
STEP 3: Completed/Installed	613	410	162	1185	3,417.2	\$22.18
<b>TOTALS</b>	<b>976</b>	<b>697</b>	<b>220</b>	<b>1893</b>	<b>5,374.2</b>	<b>\$34.15</b>

Data collected 1/16/2012

\* Step 1 system sizing (kW) and incentives (\$) are estimates based on an average system size of 2.5kW and incentive level of \$6.00/W. System designs are not completed until the Applicant is confirmed to meet all other program requirements. The majority (>90%) of projects in Step 1 will receive Step 2 reservations.

Since the beginning of the SASH Program, there has been steady and incremental growth in the number of interconnected projects each quarter (Chart 1). 2011 has been characterized by extensive increases in SASH project volume each quarter. To illustrate, in Q4 2011 SASH interconnections have nearly quadrupled from the same time last year.

Chart 1: Completed Projects per Quarter



**System size:** Chart 2 below shows that nearly 70% of installed SASH PV-systems are less than 3kW, and the average SASH installed project is around 2.5kW. Where the system size is not constrained by roof space, SASH system sizing is based upon the client's annual usage in kWh minus the energy efficiency savings the client may realize by adopting basic energy efficiency measures.

Chart 2: Completed SASH Installations by System Size

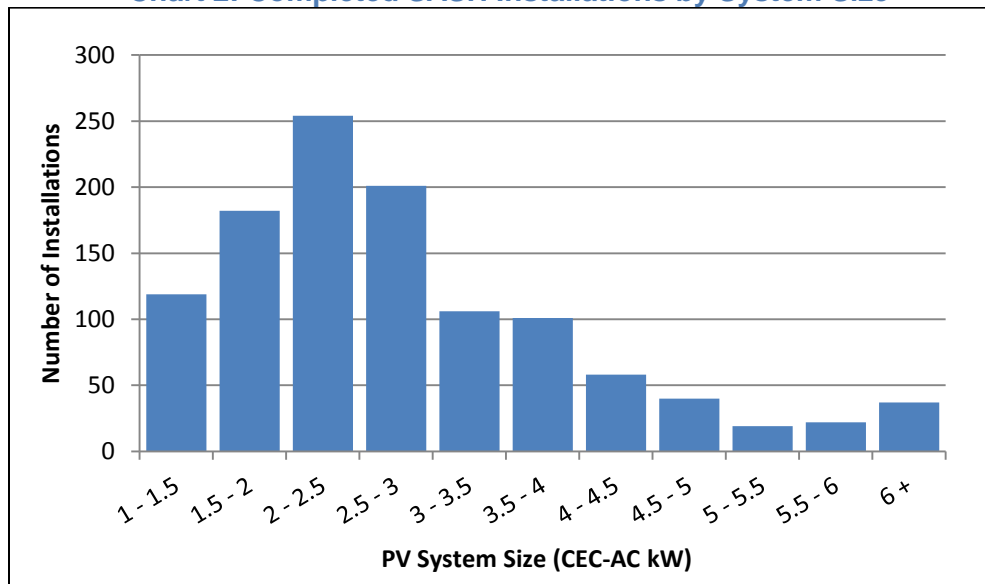
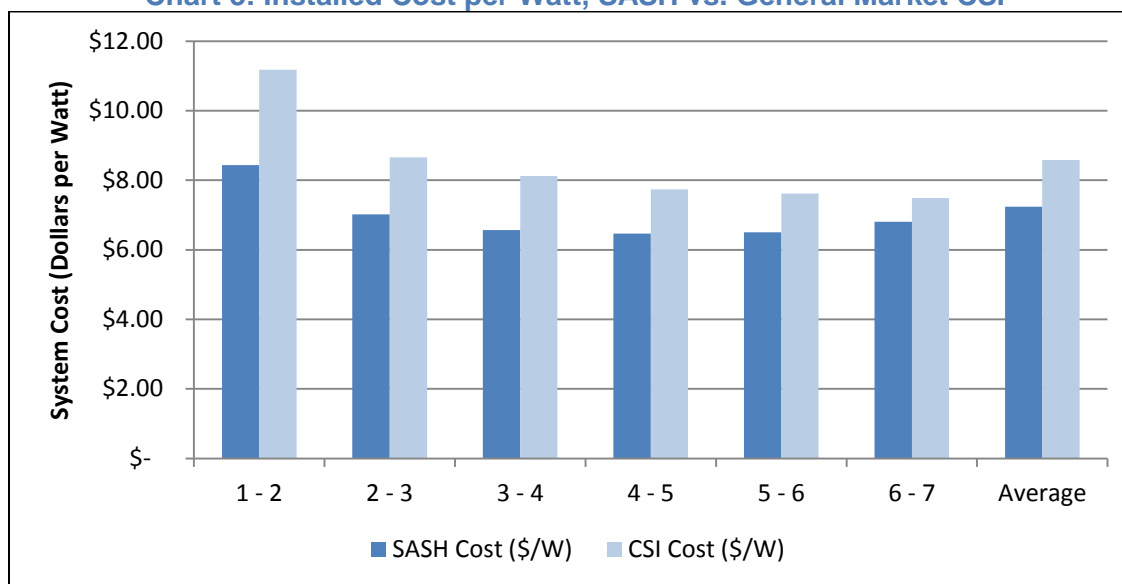


Chart 3 below compares SASH's installed cost per Watt for similarly sized systems in the general market program. On the smallest sized systems (1-1.5kW) SASH systems cost 25% less than general market systems. In addition, SASH's average installed costs remain substantially lower than installation costs for similarly sized projects in the general market CSI Program. **SASH systems' installed-cost is \$0.50/W-\$3.00/W less than general market systems**

**Chart 3: Installed Cost per Watt, SASH vs. General Market CSI**



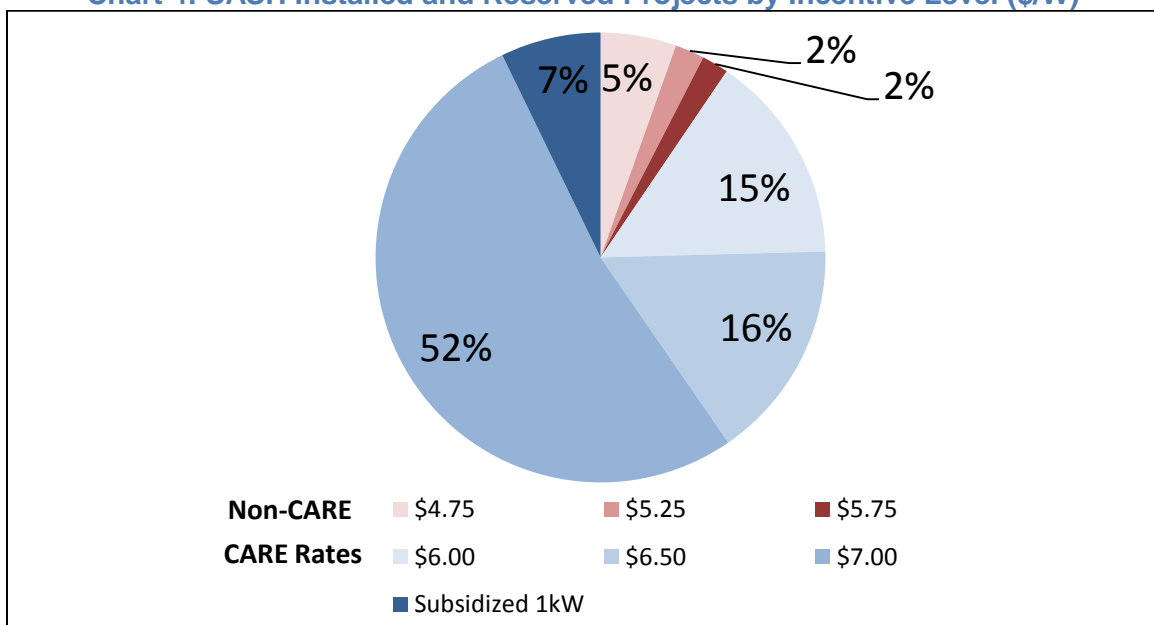
**Chart 3:** GRID's data is based on the total number (1142) of installed SASH projects to date (1/16/2012). The CSI sample set is from the California Solar Statistics (updated 1/24/2012), and is filtered to include all residential projects, under 7kW, for 1/1/2009 –1/24/2011.

## 6. Incentives and Project Financing

The SASH Program is designed to be a comprehensive low-income program, and serve homeowners in the most distressed and impoverished areas of California. Chart 4 below shows that over 90% of SASH clients qualify for CARE, a Program which has lower income requirements than SASH. This demonstrates that the SASH Program is mainly serving CARE-eligible homeowners – homeowners at the lowest income levels who need the savings provided from solar electric systems the most. Chart 4 also illustrates that GRID has been able to qualify SASH clients and install SASH systems at every incentive level offered within the Program. At the non-CARE rate incentive levels, GRID works with the homeowner to explore avenues to cover the gap between their system costs and their available incentive.



**Chart 4: SASH Installed and Reserved Projects by Incentive Level (\$/W)**



GRID works with homeowners who have a financing gap to explore individual financing options, such as a client contribution or private loan, and has experienced limited success with the gap financing challenge. Some clients are able to contribute toward covering their project gap with a family contribution or small loan. In most instances GRID has aided in overcoming the gap financing obstacle for families by contributing the organization's own fundraising dollars toward covering the gap between the available incentive and the project's costs, thereby allowing more families to go solar with the SASH Program than otherwise would have been able to do so. GRID's contributions toward covering these financing gaps include: fundraising dollars, in-kind donations, philanthropic donations, and sponsorships.

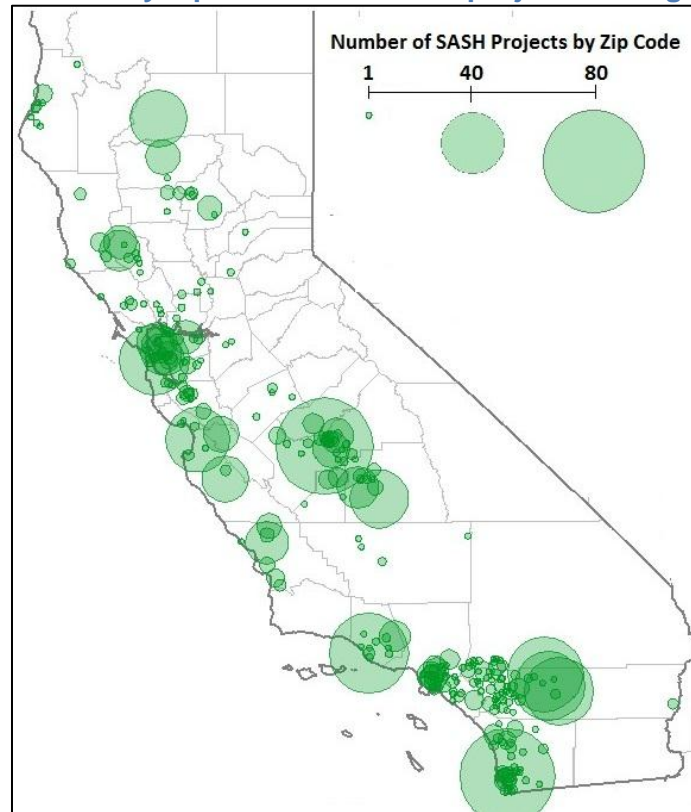
GRID's partnership with module manufacturer Yingli Solar during 2011 was a significant asset to help cover many SASH clients' gap funding requirements, and GRID anticipates continued partnerships with module manufacturers in 2012 will provide similar benefits. Given the slow economic recovery, continued tight credit markets, and the inability for most homeowners to assume more debt, gap financing remains a potential obstacle for low-income families to participate in the SASH Program.

## 7. Marketing and Outreach

GRID currently has seven offices located in Oakland (PG&E), Carson (SCE), San Diego (SDG&E), Fresno (SCE/PG&E), Atascadero (SCE/PG&E), Riverside (SCE), and Chico (PG&E).

Map 1 below shows the location of all SASH applications through Q3 2011. This map encompasses in a small circle each installed system, reserved project, and approved application from a SASH-eligible homeowner that is presently in the design review phase. The projects are mapped by California zip code, and the larger circles as shown on the legend below the map indicate multiple projects in those zip codes. Presently there are over 300 different California zip codes represented on Map 1.

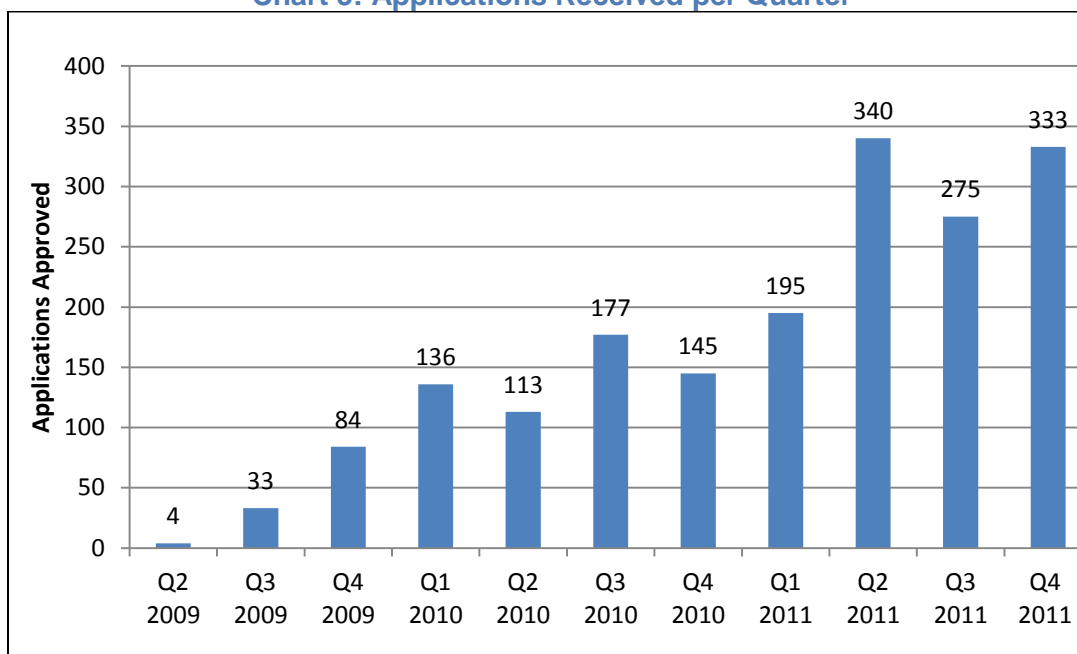
**Map 1: Location by Zip Code of all SASH projects through Q4 2011**



Map 1 above demonstrates that GRID's marketing and outreach efforts are resulting in SASH projects being installed and reserved over widely disparate geographic areas throughout the IOU territories. As regional offices further augment and enhance the outreach scope in their respective counties, GRID expects the volume of projects both to increase in established zones and to reach further across the state into new communities over time. However, based on SASH's current affordable housing requirements, rural areas will be harder to reach since resale restricted properties are less common in rural communities.

Chart 7 below shows that GRID received 333 applications from eligible SASH clients in Q4 2011, bringing the total number of approved SASH applications to 1835 – a sufficient pool of applicants to propel the SASH Program into 2012 on-track to meet its robust installation targets for the upcoming year as well as its goals for 2011. GRID continued to receive a high volume of SASH applications in Q4 2011, and from disparate geographic areas – indicating both that the marketing and outreach strategies continue to be effective; and, that SASH is gaining exposure and expanding its scope throughout the state.

**Chart 5: Applications Received per Quarter**



GRID continued to utilize many of the marketing and outreach methods proven to be effective for recruiting SASH clients and building SASH brand recognition since the inception of the Program. These activities included: leveraging partnerships with organizations trusted by low-income

homeowners, offering consumer education sessions, and increasing community exposure to the SASH program through events, media and marketing collateral.



GRID continued to leverage its existing relationships with key community partners to spearhead outreach efforts in low-income communities. This strategy has proven to be successful in these communities where individuals may be predisposed to mistrust new programs or organizations. GRID also continued to garner support and participation from the first-adopters of the SASH Program to discuss it with their neighbors and acquaintances and encourage them to contact GRID. Involving neighbors, volunteers, and civic

supporters at SASH installations helps build the SASH brand recognition on-the-ground in low-income communities, and for a wide audience of stakeholders.

## **8. Volunteer and Workforce Development**

GRID's unique volunteer-based installation model has made every in-house SASH project a workforce development opportunity for a broad range of professional interests. These volunteer and training opportunities can help create the solar market transformation sought through the California Solar Initiative. These opportunities create a well-informed public and proof that the technology can be adopted by everyone in every community within California. Over 8,000 individual volunteers or job trainees have already participated in a SASH installation and thousands more will help bring the SASH

Program and solar energy to low-income families throughout the state and will prove solar is a technology for all communities.



GRID ensures that the volunteers on SASH projects are adequately trained in safety and installation techniques and understand the SASH Program, the California Solar Initiative, and the benefits of PV-solar by requiring all volunteers to attend a mandatory volunteer orientation. Since the inception of SASH, over 5,800 individuals have completed GRID's mandatory volunteer orientation and the majority have gone on to participate in an installation. In Q4 2011, GRID's offices held over 30 orientations that were each attended by 10 to 40 prospective volunteers. In 2011, over 2,200 solar volunteers have been trained through GRID's volunteer orientation sessions.

GRID also offered Team Leader trainings in Q4 2011 to qualify volunteers for both Ground Team Leader and Roof Team Leader roles. These sessions are geared toward more experienced volunteers, and many team leaders participate in order to gain valuable resume-building experience that will aid them in their job search in the solar installation sector. These classes educate participants about more advanced PV installation techniques. Participants leave with enhanced awareness of PV solar and develop additional skills to increase their employability in California's solar industry. Presently, GRID has over 150 certified Roof and Ground Team Leaders throughout the state and a high level of participation from prospective Team Leaders seeking certification in the "Team Leader Program".

Volunteers and job trainees form the backbone to GRID's installation model and will be an important part of the overall success of the SASH program. Through Q4 2011, the SASH Program has provided over 15,800 opportunities for volunteers to become involved and over 3,300 opportunities specifically for solar installation job trainees, further strengthening California's solar industry.

GRID Alternatives has incorporated "green job" training and workforce development initiatives into the SASH Program with the following initiatives:

- **Integration of hands-on solar installation experience into low-income job training programs.** GRID Alternatives partners with existing job training organizations to incorporate GRID Alternatives' volunteer-based installation projects into their construction training curricula. GRID Alternatives dedicates 20% of its internal installations for these trainees to build hands-on experience with real-world solar PV installations that have conditions and requirements comparable to what they would encounter in private industry.
- **GRID Team Leader and ongoing hands-on opportunities of job trainees.** In addition to reserving entire installations for job training partnerships, GRID gives individual job trainees priority to participate on volunteer installations. Additionally, job trainees can participate in GRID's "Team Leader Program" that provides leadership roles on GRID's volunteer installations. These opportunities give a job trainee more opportunities to get the critical hands-on PV-installation experience required by most PV-solar contractors. Through Q4 2011, GRID has qualified over 150 individuals as Certified Roof and Ground Team Leaders.



- **Team Leaders may apply their experience toward NABCEP certification.** The North American Board of Certified Energy Practitioners (NABCEP) is widely recognized and accepted as the definitive certification for solar energy professionals. An individual pursuing NABCEP's PV solar installer certification must meet the Board's requirement of having completed two PV solar installations as part of their application. One of the auxiliary benefits for a GRID Team Leader to become "Certified" to lead volunteer SASH installations by completing various GRID Team Leader requirements is that the experience can be applied toward meeting NABCEP's requisite installations. Several of GRID's standout "Certified" Team Leaders have applied their GRID experience toward their successful pursuit of their NABCEP certification, thereby improving their resume for prospective employers and making them more competitive in the job market.
- **Paid work and job placement opportunities for training program graduates.** Students or graduates of these job training organizations may be provided with short-term paid work and opportunities for long-term job placement in the solar PV industry through the Subcontractor Partnership Program (SPP). These trainees will work alongside experienced installers from for-profit companies to install SASH systems, reducing total installation costs for the homeowner while providing the job trainees and the contractors with extended, paid "field interviews" where the trainees can be evaluated for available long-term installer positions with the company. Through Q4 2011, over 400 paid job opportunities have come to fruition for California solar job trainees through SPP installations.
- **Innovative new partnerships between private industry and community-based job training organizations.** The Sub-Contractor Partnership Program's job training requirement helps foster new partnerships between for-profit sub-contractors with local workforce development programs. The requirement that sub-contractors use one or more job trainees for each SASH installation often causes the for-profit company to look to community job training organizations or other local green job programs that they otherwise might not have considered when hiring new staff. Not only does this increase the breadth and impact of SASH on the solar industry's job development, but also can prove to a for-profit contractor that solar can be a viable technology for all and that outstanding employees can come from all neighborhoods and backgrounds.
- **General volunteering opportunities.** Over 7,200 volunteers have completed GRID's volunteer/solar orientation. Since the inception of the SASH Program, over 5,800 volunteers participated in GRID's educational solar orientation program and worked directly on SASH installations. The orientation program allows GRID to promote solar energy and educates volunteers on solar technologies, the importance of energy efficiency, and the CSI incentive programs.

Providing low-income individuals with hands-on solar installation experience and avenues to employment in the growing solar PV installation industry is an important part of GRID Alternatives' mission to empower communities in need through renewable energy. GRID Alternatives currently partners with a growing number of low-income job training organizations interested in providing green-collar job training to their constituents. These programs need to provide real-world, hands-on experience for their trainees. GRID's volunteer-based installation model lends itself perfectly to this need – these projects serve as a solar PV version of a teaching hospital, where trainees can "learn by doing" in the field and gain valuable exposure, experience and skills that will significantly increase their employability.

The Sub-Contractor Partnership Program requires all contractors to use one or more current or recent solar job trainees on each sub-contracted SASH installation. Through Q4 2011, over 400 paid employment opportunities for job trainees have resulted from installations orchestrated through this Program. Though there is not a requirement to hire the trainee for full-time work, several sub-contractors have promoted the job trainees they employed on SASH installs to full-time work with the company. This becomes a double benefit to the low-income community since many solar job trainees come from the same communities that the SASH Program aims to serve. GRID encourages sub-contractors to hire from the local communities whenever possible. This will continue to propel the California solar industry forward and provide long lasting benefits beyond the scope of the CSI and SASH programs' lifecycles.

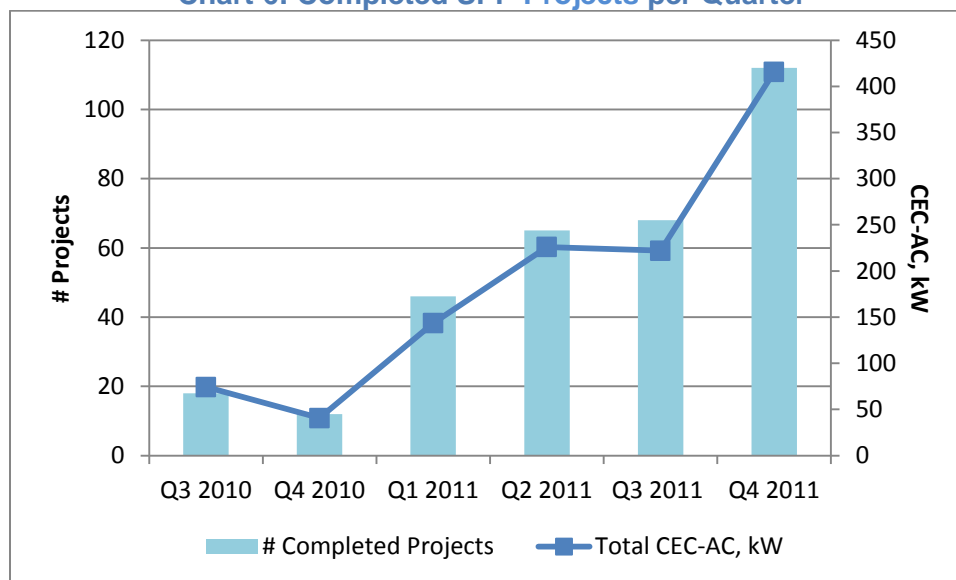
## 9. Sub-Contractor Partnership Program

The SASH Sub-Contractor Partnership Program (SPP) provides opportunities for licensed CA contractors to participate in SASH installations. Qualified contracting companies agree to a reduced cost model and commit to hiring at least one eligible job trainee for each SASH installation. Currently, GRID is not accepting new contractors into SPP. If necessary, GRID will re-open the program in the future, but GRID is confident that the existing contractors can handle the volume of projects planned for upcoming quarters.

Since the beginning of the Program, SASH sub-contractors have installed and interconnected 321 SASH solar electric systems – about one-third of these were completed in Q4 2011. SPP is an integral part of SASH and will continue to increase its installation volume each year.

The volume of completed SPP projects has accelerated tremendously in each quarter of 2011 as compared to 2010. Chart 8 below shows the incremental increases in the number of SASH projects completed and interconnected through SPP since the inception of the program.

**Chart 6: Completed SPP Projects per Quarter**



The SPP program promotes partnerships between solar contractors and local workforce development programs by incorporating a job training requirement for all sub-contracted SASH projects. This



becomes a double benefit to the low-income community since many solar job trainees come from the same communities that the SASH Program aims to serve. GRID encourages sub-contractors to hire from the local communities whenever possible and provides contact lists of eligible local programs and job training partners to assist in this endeavor.

By requiring SASH sub-contractors to hire a job trainee for each installation, new connections are frequently formed between for-profit solar installers and community job training organizations and schools. Conventionally, solar companies may not look to community green jobs training programs when hiring a new team member; but, with the SASH requirement, the company now serves as a bridge between a job training organization and a paid employment opportunity in the solar installation field for a recent graduate.

## 10. Energy Efficiency

Energy efficiency (EE) remains an important part of the SASH program and the overall mission of GRID Alternatives. GRID believes that energy efficiency is the essential first step to implement in clients' homes before installing solar PV. To this end, GRID performs an energy efficiency audit for every SASH applicant and shares comprehensive EE report with the homeowner. The EE report is based on the Department of Energy's Home Energy Saver online tool. The audit is conducted regardless of the clients' enrollment into CARE or LIEE. GRID works with the LIEE program administrators to enroll homeowners into LIEE if they are eligible, and with the IOUs to streamline LIEE enrollment for SASH clients. The following Table 5 summarizes the number of homeowners that qualified and were enrolled into the LIEE programs.

**Table 4: LIEE Enrollment**

Utility	Total
PG&E	538
SCE	634
SDG&E	177
<b>Total</b>	<b>1349</b>